ABSTRACT

In accordance with the invention, an illumination device comprises a substrate having a surface and a cavity in the surface. At least one light emitting diode ("LED") is mounted within the cavity, and a monolayer comprising phosphor particles overlies the LED. The phosphor monolayer is adhered to the LED by a monolayer of transparent adhesive material. An optional optical thick layer of transparent material overlies the phosphor monolayer to encapsulate the LED and optionally to form a lens. Methods and apparatus for efficiently making the devices are disclosed.